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cmel.* means for circulating said liquid gallium between said reservoir of liquid gallium, said heat exchanger and the neutron source assembly to remove heat from a neutron generating target low Z material within the neutron source assembly.

REMARKS

Claim 8 has been amended. Claims 1-8 remain for further consideration. No new matter has been added.

The rejections shall be taken up in the order presented in the Official Action.

1. Formal drawings shall be submitted upon an indication of allowable subject matter.
- 2-3. The specification will be amended to indicate that FIG. 2 illustrates a portion of the moderator/reflector assembly.
4. The specification will be amended to indicate that FIG. 2 illustrates a portion of the moderator/reflector assembly.
- 5-6. Claims 1-8 currently stand rejected under 35 U.S.C. §112(b) for allegedly being non-enabling.

FIG. 1 clearly illustrates the flow path from the neutron source 12 to the heat exchanger 24. In addition, FIG. 2 clearly illustrates an exit path in the upper right hand corner of the device 30 (no numerical designator is illustrated in FIG. 2 to the exit).

7. Claims 1-2 and 4-8 currently stand rejected for allegedly being obvious in view of U.S. Patent 5,392,319 to Eggers (hereinafter "Eggers") in view of either U.S. Patent 5,784,423 to Lidsky et al (hereinafter "Lidsky"), U.S. Patent 4,811,687 to Prince (hereinafter "Prince") or U.S. Patent 4,953,191 to Smither et al (hereinafter "Smither").

It is recognized that Eggers fails to disclose "*a neutron source target cooled by liquid gallium, ...*". (Official Action, pg. 4). However, it is then alleged that a skilled person would be motivated to modify the system disclosed in Eggers to include the liquid gallium coolant disclosed in either one of Lidsky, Prince or Smither.

Lidsky discloses a system that employs a high-Z target material (see col. 4, lines 20-21). In contrast, claim 1 of the present invention recites a method of "*cooling a low Z target material by circulating liquid gallium past the target material to cool the low Z target material.*" (emphasis added, cl. 1). Claim 5 recites a neutron source assembly that includes "*a modulator/reflector assembly that includes a low Z target material that is bombarded by accelerated particles to produce a neutron flux;*". (emphasis added). As amended, claim 8 recites a liquid cooling system that includes "*means for circulating said liquid gallium between said reservoir of liquid gallium, said heat exchanger and the neutron source assembly to remove heat from a neutron generating target low Z material within the neutron source assembly.*" (emphasis added). Therefore, even assuming for the moment that Lidsky and Eggers are properly combinable, the resultant combination still fails to disclose cooling a low-Z material as claimed.

Prince discloses the use of liquid gallium as a coolant in an apparatus for thin film deposition (see col. 2, lines 50-66). A skilled person working in the field of the present invention would certainly not look to the field of thin-film deposition (e.g., metals, dielectrics, semiconductors) as disclosed in Prince. The present invention relates to the field of accelerator

based neutron sources having a liquid cooled target, and has nothing to do with depositing thin films as set forth in Prince.

Smither discloses that liquid gallium metal can be used as both a target for electrons and as a cooling fluid in a rotating anode x-ray tube. Specifically, Smither recites “[t]he liquid gallium metal serves as both the target for the electrons and as the cooling fluid, in that the heat generated by the electron beam is carried away by the flowing stream of liquid gallium.” (col. 2, lines 62-65). It is alleged that a skilled person would utilize the liquid gallium to enhance cooling to the high temperature target. However, as set forth above a fair and proper reading of Smither reveals that it simply discloses liquid gallium as the target material, and the heat generated by the target (i.e., the liquid gallium) is carried away by the target. If this teaching is applied to the present invention, then the system would no longer work since the source and the coolant would be one and the same. Therefore, even if Eggers is modified as set forth in the Official Action, the resultant device would no longer work for its intended purpose since Smither discloses using liquid gallium as the target.

In addition, the Official Action fails to set forth a prima facie case of obviousness. Specifically, the Official Action does not recite where in the prior art there is the necessary teaching, suggestion or incentive that would lead one of ordinary skill in the art to modify the device of Eggers according to the teaching of the cited references.

“Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching suggestion or incentive supporting the combination.” In re Geiger, 2 U.S.P.Q.2d 1276, 1278 (Fed. Cir. 1987). *“Although the Commissioner suggests that [the structure in the primary prior art reference] could readily be modified to form the [claimed] structure, ‘[t]he mere fact that the prior art could be so modified*

would not have made the modification obvious unless the prior art suggested the desirability of the modification.’” In re Laskowski, 10 U.S.P.Q.2d 1397, 1398 (Fed. Cir. 1989), citing In re Gordon, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984). In addition, “[w]hen the incentive to combine the teachings of the references is not readily apparent, it is the duty of the examiner to explain why the combination of the reference teachings is proper.” Ex parte Stone, 2 U.S.P.Q.2d 1788, 1790 (Bd.App. & Int’f 1986) (emphasis added).

As noted above, it is fundamental that obviousness can not be established absent some teaching to combine the references, or a suggestion or incentive supporting the combination of references. See In re Geiger, at 1278 (Fed. Cir. 1987). In the instant case the Official Action is lacking the necessary factual, non-conclusionary explanation why the combination of Eggers and any of secondary references is proper. Hence, it is respectfully submitted that a prima facie case of obviousness has not been presented since there is no proper teaching, suggestion or incentive that would lead one of ordinary skill in the art to modify Eggers as alleged to create the claimed invention.

9. Claim 3 currently stands rejected for allegedly being obvious in view of Eggers, and any of Lidsky, Prince, or Smither, addition to U.S. Patent 5,917,874 to Schlyer et al (hereinafter “Schlyer”).

It is respectfully submitted that rejection is now moot, since claim 3 depends from claim 1, which is patentable for at least all the reasons set forth above.

For all the foregoing reasons, reconsideration and allowance of claims 1-8 is respectfully requested.

If a telephone interview could assist in the prosecution of this application, please call the undersigned attorney.

Respectfully submitted,

A handwritten signature in cursive script, reading "Patrick O'Shea". The signature is written in black ink and is positioned above a horizontal line.

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